Differential pressure transmitter

Huba Control

Relative and differential pressure transmitter

Type 699M

Modbus

The pressure transmitter 699M is used primarily for the monitoring of air and neutral gasses. The unit is optionally available with one or two differential pressure sensors, which allows the observation of differential pressure or volumetric flow at two individual points in the system. This makes the 699M ideally suited for a multitude of tasks in the HVAC industry.

The 699M communicates via Modbus® RTU and features two universal inputs in addition to two analog outputs. The linking of further sensors and control of actuators offers the option of using the unit as a decentralized node for existing controllers, extending in- and outputs, and lowering installation costs.

The sensors utilized by the unit are based on the unique and well-proven ceramic strain-gauge beam technology developed by Huba Control AG.

Pressure range

0 ... 500 – 7000 Pa

+ High accuracy and long-term stability via ceramic strain-gauge technology
+ Modbus® RTU interface
+ Available with one or two differential pressure sensor units
+ Up to two universal inputs for 0 ... 10 V or passive temperature elements
+ Two 0 ... 10 V analog outputs
+ Simple installation, reduced wiring effort through decentralized node

Technical overview

Pressure range

Relative and differential		0 ... 500 – 7000 Pa
Measuring variables		Pa, psi, mmHG, mmH_2O

Operating conditions

Medium		Air and neutral gases (not condensing)
Temperature	Medium	0 ... +70 °C
	Ambient	-25 ... +50 °C
	Storage	-30 ... +70 °C
	No condensation	
Tolerable overload on one side (short-term)		P+ = 10'000 Pa / P- = 400 Pa
Rupture pressure	Ambient temperature	20'000 Pa
	70 °C	15'000 Pa

Materials in contact with medium

Sensor	Ceramic Al_2O_3 (96%)
Diaphragm	Silicone
Housing	Polycarbonat PC / Polyamide (PA)

Electrical overview

Power consumption		< 2 VA
Power supply		24 VAC/DC ±15%
Voltage outputs		2x 0 ... 10 V
Universal inputs		2x 0 ... 10 V / PT1000 / LG-Ni1000 / NTC10K / Ni1000
Response time		< 1 s
Polarity reversal protection	Short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to max. supply voltage.	
Wire length	signal wiring	max. 50 m
	Modbus® wiring	max. 100 m

Protection standard	**Protection class**
IP 54	III

Modbus®

Address range		1-247 (40 = default if DIP = 0)
Baudrate		9'600 - 57'600
Format		Modbus® RTU
Line termination		selectable via DIP-Switch
Hardware		RS485
Standard configuration	selectable via DIP-Switch	9600E1 (9600 baud rate, 1 stop bit, even parity)

Interface

Push button	Zero point reset, reset on factory setting
DIP switch	Modbus® adress, baud rate, parity and scheduling
LED	Status indication (red, yellow, green, blue)

Electrical connection

Screw terminals for wire and stranded conductors up to 2.5 mm^2
2 x cable bushing ⌀15 for cable Ø 3 - 6 mm
2 x cable bushing ⌀20 for cable Ø 5 - 10 mm

Analogue outputs A01, A02

Accuracy	0 ... 10 VDC	0 V	±66 mV
		5 V	±95 mV
		10 V	±124 mV
Resolution		< 11 mV	
Output current		max. 1 mA	

Analogue inputs AI1, AI2			**Accuracy**	**Resolution**	**TK/$B_{25/85}$**
Accuracy	configured as PT1000	-50 ... +150°°C	±0.5 K	0.1 K	3850 ppm/K
	configured as LG-Ni1000	-50 ... +150°°C	±0.5 K	0.1 K	5000 ppm/K
	configured as NTC10K	-50 ... -26°°C	±1.0 K	0.2 K	3979 ppm/K
		-25 ... +99°°C	±0.5 K	0.1 K	3979 ppm/K
		+100 ... +150 °C	±3.0 K	0.5 K	3979 ppm/K
	configured as Ni1000	-50 ... +150°°C	±0.5 K	0.1 K	6180 ppm/K
	configured as 0 ... 10 VDC	0 V	±5 mV	< 5 mV	-
		5 V	±25 mV	< 5 mV	-
		10 V	±50 mV	< 5 mV	-
Input resistance			min. 100 kΩ		

Flow calculation

Permitted K-Factor range	0 ... 1500
Calculation Formula	$Q = k * \sqrt{\Delta P}$
Measuring variables	l/s, m^3/h, m^3/s

Pressure connection

Connection pipe	Ø 6.2 mm (for pipe inside Ø 5 mm)

Mounting instructions

Installation arrangement	**Factory calibration:** Vertical with pressure connections downwards
Mounting	Mounting bracket (integrated in case)

Tests / Admissions

UL	ANSI/UL 60730-1
CE-conformity	acc. 2014/30/EU applied standard EN 60730-1
EAC	

Weight

~ 250 g

Packaging

Single packaging in cardboard
Multiple packaging (20 pcs.)

Accuracy

Parameter	Unit	0 ... 500 Pa	0 ... 1250 Pa	0 ... 2500 Pa	0 ... 5500 Pa	0 ... 7000 Pa
Overall accuracy at +20 °C	% fs	< ±1.0	< ±0.5	< ±0.5	< ±0.6	< ±0.7
Overall accuracy at 0 ... +50 °C	% fs	< ±2.0	< ±1.0	< ±1.0	< ±0.8	< ±0.8
Resolution	% fs	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Long therm stability acc. DIN EN 60770	% fs	< ±1.0	< ±1.0	< ±1.0	< ±1.0	< ±1.0

Test conditions:
25 °C,45% rh, power supply 24 VDC

Order code selection table

		699M.	1	2	3	4	5	6	7	8	9
			X	X	X	X	X	X	X	X	X
Pressure range P1 [1]	0 ... 500 Pa		0	5							
	0 ... 1250 Pa		1	2							
	0 ... 2500 Pa		2	5							
	0 ... 5500 Pa		5	5							
	0 ... 7000 Pa		7	0							
Pressure range P2 [1]	without pressure connection P2				0	0					
	0 ... 500 Pa				0	5					
	0 ... 1250 Pa				1	2					
	0 ... 2500 Pa				2	5					
	0 ... 5500 Pa				5	5					
	0 ... 7000 Pa				7	0					
Communication	Modbus® RTU						M				
Analogue input	2 x universal inputs 0 ... 10 VDC, temperature (PT1000 / LG-Ni1000 / NTC10K / NI1000)							2			
Analogue output	2 x 0 ... 10 V								2		
Electrical connection	4 x cable bushing for cable	2x Ø3 ... 6 mm + 2x Ø5 ... 10 mm incl. blanking plug								4	
Pressure connnection	Connection pipe Ø 6.2 mm	for tube di = 5 mm without orifice									0
	Connection pipe Ø 6.2 mm	for tube di = 5 mm with orifice									1

Accessories *(supplied loose)*

		Order number
Connection kit for vent duct (metal), 90° angled, 2pcs (Fig. 1)	including tube 2 m long	104312
Connection kit for vent duct (plastic), straight, 2 pcs (Fig. 2)	including tube 2 m long	100064

Dimensions in mm / Electrical connections

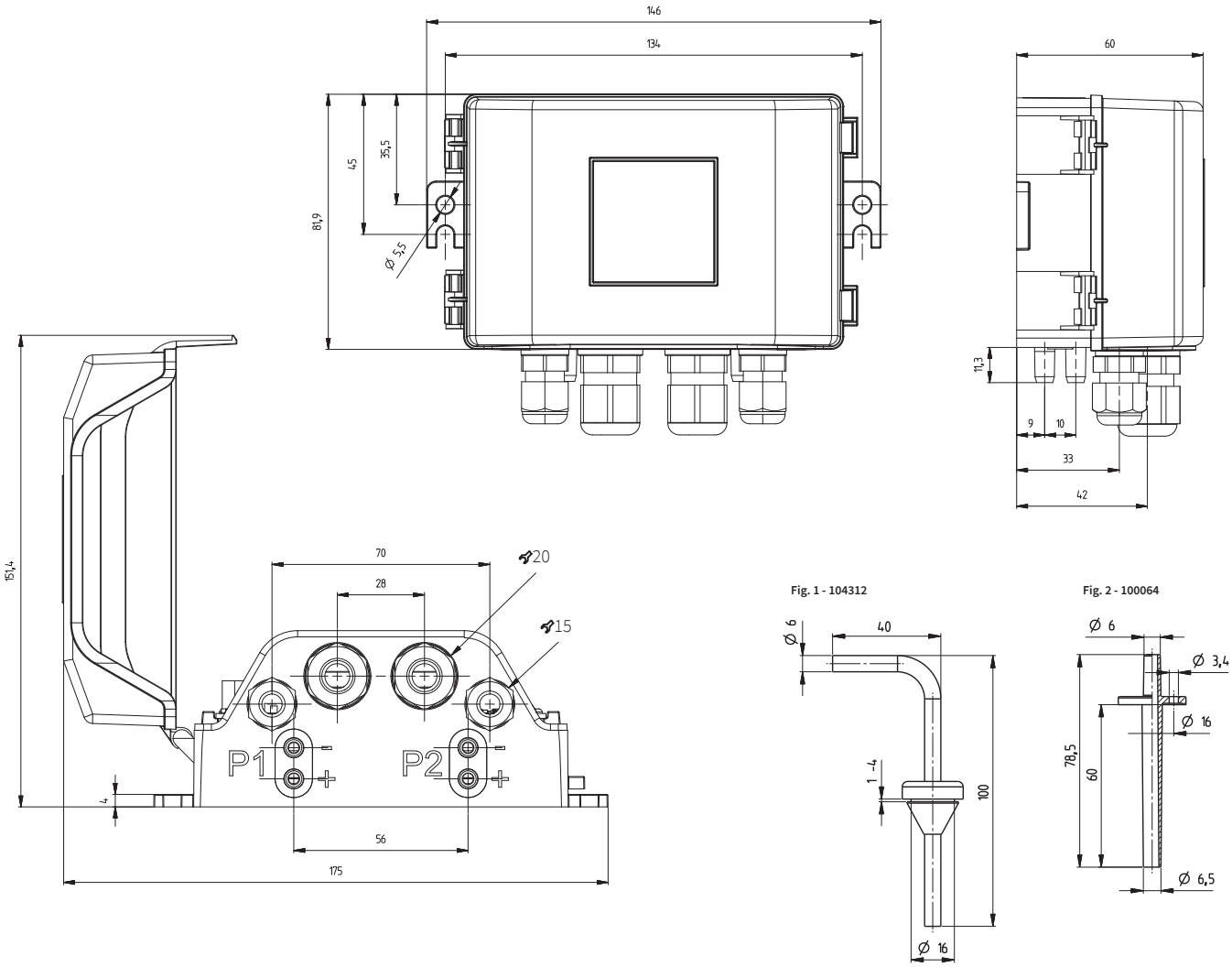
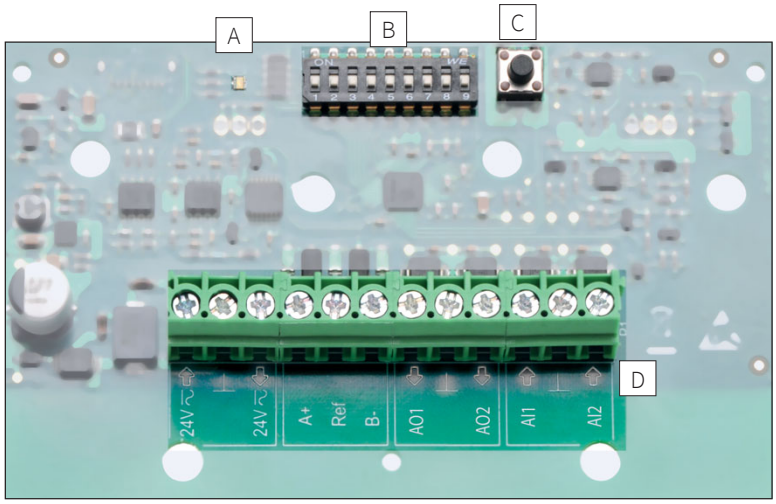


Fig. 1 - 104312

Fig. 2 - 100064

[1] max. 10000 Pa (over pressure on one side)

Setting and connection elements



A	Status LED
B	DIP switch
C	Push button
24 V ~ →	Power supply 24 VAC/DC
⊥	GND
24 V ~ ←	Power supply external devices 24 VAC/DC
A+	Modbus® communication +
Ref	Common
B-	Modbus® communication -
AO1 ←	Analogue output 1
⊥	GND
AO2 ←	Analogue output 2
AI1 →	Analogue input 1
⊥	GND
AI2 →	Analogue input 2

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